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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,310	04/08/2004	Kallol Bera	8549/ETCH/DRIE/JB1	9721

44182 7590 09/06/2007

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EXAMINER	
ZERVIGON, RUDY	
ART UNIT	**PAPER NUMBER**
1763	

MAIL DATE	DELIVERY MODE
09/06/2007	PAPER

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/821,310
Filing Date: April 08, 2004
Appellant(s): BERA ET AL.

Keith P. Taboada
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed May 21, 2007 appealing from the Office action mailed November 14, 2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

NEW GROUND OF REJECTION: Claim 25[1] is rejected under 35 U.S.C. 103(a) as being unpatentable over Li; Yicheng et al. (US 6448536 B2).

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6448536	LI	9-2002

[1] The Examiner's November 14, 2006 final rejection shows a technical error in adding claim 25 in the rejection of claims 1-3, 5, 6, 9-11, 14-16, 18, and 25-30 as being unpatentable over Komino; Mitsuaki et al. (US 6,156,151 A) in view of Yonenaga; Tomihiro et al. (US 5972114 A). A new ground of rejection of claim 25 under the same basis as proposed in the rejection of claims 1-3, 5, 6, 9-11, 14-16, 18, and 25-30 being unpatentable over Li; Yicheng et al. (US 6448536 B2) in view of Yonenaga; Tomihiro et al. (US 5972114 A) is proposed.

6156151	KOMINO	12-2000
5972114	YONENAGA	10-1999

(9) Grounds of Rejection

The following grounds of rejection are applicable to the appealed claims:

Claims 23-25[2] are rejected under 35 U.S.C. 103(a) as being unpatentable over Li; Yicheng et al. (US 6448536 B2) – NEW GROUND OF REJECTION

Claims 1-3, 5, 6, 9-11, 14-16, 18, and 26-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komino; Mitsuaki et al. (US 6,156,151 A) in view of Yonenaga; Tomihiro et al. (US 5972114 A).

Claims 7, 8, 13, and 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komino; Mitsuaki et al. (US 6,156,151 A) in view of Yonenaga; Tomihiro et al. (US 5972114 A).

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li; Yicheng et al. (US 6448536 B2). Li teaches a semiconductor substrate processing system (Figure 1; column 4, lines 13-33) comprising: a processing chamber (1; Figure 1) a substrate support pedestal (3; Figure 1) disposed in the chamber (1; Figure 1); a gas inlet (21; Figure 1) formed in the chamber (1; Figure 1) above the pedestal (3; Figure 1) for supplying a process gas into a process region

[2] The Examiner's November 14, 2006 final rejection shows a technical error in adding claim 25 in the rejection of claims 1-3, 5, 6, 9-11, 14-16, 18, and 25-30 as being unpatentable over Komino; Mitsuaki et al. (US 6,156,151 A) in view of Yonenaga; Tomihiro et al. (US 5972114 A). A new ground of rejection of claim 25 under the same basis as

(2; Figure 1) above the support pedestal (3; Figure 1); an exhaust port (27a; Figure 1) formed in a wall (1; Figure 1) of the chamber (1; Figure 1) and the restrictor plate (26; Figure 1,2; column 5; lines 35-54) at least partially circumscribing the substrate support pedestal (3; Figure 1) and adapted to control the flow of at least one gas flowing between the process region (2; Figure 1) and the exhaust port (27a; Figure 1), wherein a first predetermined gap (5; Figure 1) is between the substrate support pedestal (3; Figure 1) and the restrictor plate (26; Figure 1,2; column 5; lines 35-54) - claim 23. Li further teaches the system (Figure 1; column 4, lines 13-33) of claim 23, wherein the restrictor plate (26; Figure 1,2; column 5; lines 35-54) further comprises a plurality of removable arc segments – Figure 2 shows element 26 separated at 120° increments, as claimed by claim 24

Li further teaches the system (Figure 1; column 4, lines 13-33) of claim 23 further comprising: a plurality of support pins (5; Figure 1) coupling the restrictor plate (26; Figure 1,2; column 5; lines 35-54) to a bottom of the processing chamber (1; Figure 1), as claimed by claim 25

Li does not teach a restrictor plate (26; Figure 1,2; column 5; lines 35-54) supported within the processing chamber (1; Figure 1) in a laterally spaced-apart relation relative to the substrate support pedestal (3; Figure 1) and sidewalls of the processing chamber (1; Figure 1), and a second predetermined gap is between the restrictor plate (26; Figure 1,2; column 5; lines 35-54) and the sidewalls of the processing chamber (1; Figure 1) – claim 23.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the dimension(s) of Li's restrictor plate (26; Figure 1,2; column 5; lines 35-54), including adding additional restrictor plate (26; Figure 1,2; column 5; lines 35-54) hole(s) (25;

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proposed in the rejection of claims 23 and 24 being unpatentable over Li; Yicheng et al. (US 6448536 B2) is

Figure 1) to the perimeter of Li's restrictor plate (26; Figure 1,2; column 5; lines 35-54) providing a second predetermined gap.

Motivation to optimize the dimension(s) of Li's restrictor plate (26; Figure 1,2; column 5; lines 35-54) including adding additional restrictor plate (26; Figure 1,2; column 5; lines 35-54) hole(s) (25; Figure 1) to the perimeter of Li's restrictor plate (26; Figure 1,2; column 5; lines 35-54) providing a second predetermined gap is for controlling exhaust flow across 26 as taught by Li (column 5; lines 27-35).

Claims 1-3, 5, 6, 9-11, 14-16, 18, and 26-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komino; Mitsuaki et al. (US 6,156,151 A) in view of Yonenaga; Tomihiro et al. (US 5972114 A). Komino teaches Apparatus (Figure 1; column 3, line 60 - column 4, line 54) for controlling the flow of a gas between a process region (101; Figure 1) and an exhaust port (112a, 2; Figure 1) in a semiconductor substrate processing chamber (CC; Figure 1,4), comprising; at least one restrictor plate (118; Figures 2-4, column 6, lines 26-41) supported within the semiconductor processing chamber (CC; Figure 1,4) and adapted to at least partially circumscribe a substrate support pedestal (114; Figure 1, 4), the restrictor plate (118; Figures 2-4, column 6, lines 26-41) adapted to control the flow of at least one gas flowing between the process region (101; Figure 1) and the exhaust port (112a, 2; Figure 1), as claimed by claim 1

Komino further teaches:

i. The apparatus (Figure 1; column 3, line 60 - column 4, line 54) of claim 1, further comprising: a base (LC; Figure 1) adapted to be coupled to a bottom of the processing chamber (CC; Figure 1,4); and a support ring (111b; Figure 1,2) coupled to the base (LC;

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proposed.

Figure 1) in a vertically spaced apart orientation, wherein the at least one restrictor plate (118; Figures 2-4, column 6, lines 26-41) is coupled to the support ring (111b; Figure 1,2), as claimed by claim 2

ii. The apparatus (Figure 1; column 3, line 60 - column 4, line 54) of claim 1, wherein the at least one restrictor plate (118; Figures 2-4, column 6, lines 26-41) having an annular shape which at least partially circumscribes the substrate support pedestal (114; Figure 1, 4), as claimed by claim 6

iii. The apparatus (Figure 1; column 3, line 60 - column 4, line 54) of claim 1, wherein the at least one restrictor plate (118; Figures 2-4, column 6, lines 26-41) further comprises a plurality of restrictor plates (118; Figures 2-4, column 6, lines 26-41), wherein each restrictor plate (118; Figures 2-4, column 6, lines 26-41) abuts at least one other restrictor plate (118; Figures 2-4, column 6, lines 26-41), as claimed by claim 9

iv. The system (Figure 1; column 3, line 60 - column 4, line 54) of claim 10, wherein the at least one restrictor plate (118; Figures 2-4, column 6, lines 26-41) is a plurality of restrictor plates (118; Figures 2-4, column 6, lines 26-41) having an arcuate shape, as claimed by claim 14

v. The system (Figure 1; column 3, line 60 - column 4, line 54) of claim 14, wherein the plurality of restrictor plates (118; Figures 2-4, column 6, lines 26-41) substantially surround the substrate support pedestal (114; Figure 1, 4), as claimed by claim 15

vi. The system (Figure 1; column 3, line 60 - column 4, line 54) of claim 15, wherein at least a portion of an outer edge of the plurality of restrictor plates (118; Figures 2-4, column 6, lines 26-41) reduces a gap defined between the outer edge and an inner wall of the

chamber (CC; Figure 1,4) proximate the exhaust port (112a, 2; Figure 1), as claimed by claim 16

vii. The system (Figure 1; column 3, line 60 - column 4, line 54) of claim 10, wherein the one restrictor plate (118; Figures 2-4, column 6, lines 26-41) has an annular shape which substantially surrounds the substrate support pedestal (114; Figure 1, 4), as claimed by claim 18

Komino does not teach a plurality of support pins supporting Komino's restrictor plate (118; Figures 2-4, column 6, lines 26-41) as claimed by claim 1.

Komino further does not teach:

i. The apparatus (Figure 1; column 3, line 60 - column 4, line 54) of claim 2, wherein the at least one restrictor plate (118; Figures 2-4, column 6, lines 26-41) is configured to be laterally spaced apart from the substrate support pedestal (114; Figure 1, 4) and an interior wall of the processing chamber (CC; Figure 1,4), as claimed by claim 3

ii. The apparatus (Figure 1; column 3, line 60 - column 4, line 54) of claim 3, wherein the support pins (113, 116; Figure 2) retain the supporting ring (111b; Figure 1,2) in a non-parallel orientation with respect to a plane defined by a substrate support (114; Figure 1, 4) surface of the substrate support pedestal (114; Figure 1, 4), as claimed by claim 5

iii. A semiconductor substrate processing system (Figure 1; column 3, line 60 - column 4, line 54) comprising: a processing chamber (CC; Figure 1,4); a substrate support pedestal (114; Figure 1, 4) disposed in the chamber (CC; Figure 1,4); a gas inlet (106; Figure 2) formed in the chamber (CC; Figure 1,4) above the pedestal (114; Figure 1, 4) for supplying a process gas into a process region (101; Figure 1) above the support pedestal

(114; Figure 1, 4); an exhaust port (112a, 2; Figure 1) formed in a wall of the chamber (CC; Figure 1,4) and at least one restrictor plate (118; Figures 2-4, column 6, lines 26-41) supported within the processing chamber (CC; Figure 1,4) by a plurality of support pins and at least partially circumscribing the substrate support pedestal (114; Figure 1, 4) , the restrictor plate (118; Figures 2-4, column 6, lines 26-41) adapted to control the flow of at least one gas flowing between the process region (101; Figure 1) and the exhaust port (112a, 2; Figure 1), as claimed by claim 10

iv. The system (Figure 1; column 3, line 60 - column 4, line 54) of claim 10, further comprising: a base (LC; Figure 1) adapted to be coupled to a bottom of the processing chamber (CC; Figure 1,4); and a support ring (111b; Figure 1,2) coupled to the base (LC; Figure 1) via a plurality of support pins in a vertically spaced apart orientation wherein the at least one restrictor plate (118; Figures 2-4, column 6, lines 26-41) is coupled to the support ring (111b; Figure 1,2), as claimed by claim 11

v. The apparatus of claim 1, wherein a length of the support pins is adjustable, as claimed by claim 26

vi. The apparatus of claim 1, wherein the restrictor plate (118; Figures 2-4, column 6, lines 26-41) has an oval profile, as claimed by claim 27

vii. A semiconductor substrate processing system, comprising: a processing chamber (CC; Figure 1,4); a substrate support pedestal (114; Figure 1, 4) disposed in the processing chamber (CC; Figure 1,4); a gas inlet (106; Figure 2) formed in the processing chamber (CC; Figure 1,4) above the pedestal for supplying a process gas into a process region (101; Figure 1) defined in the processing chamber (CC; Figure 1,4) above the support

pedestal (114; Figure 1, 4); an exhaust port (112a, 2; Figure 1) formed in a wall of the processing chamber (CC; Figure 1,4); a restrictor plate (118; Figures 2-4, column 6, lines 26-41) supported within the processing chamber (CC; Figure 1,4) in a laterally space-apart relation relative to the support pedestal (114; Figure 1, 4) and sidewalls of the processing chamber (CC; Figure 1,4), the restrictor plate (118; Figures 2-4, column 6, lines 26-41) at least partially circumscribing the substrate support pedestal (114; Figure 1, 4) and positioned above the exhaust port (112a, 2; Figure 1); and a plurality of pins extending between the restrictor plate (118; Figures 2-4, column 6, lines 26-41) and a bottom of the processing chamber (CC; Figure 1,4), as claimed by claim 28

viii. The apparatus (Figure 1; column 3, line 60 - column 4, line 54) of claim 1, wherein the at least one restrictor plate (118; Figures 2-4, column 6, lines 26-41) is supported within the processing chamber (CC; Figure 1,4) in a laterally spaced-apart relation (118b; Figure 1) relative to the substrate support pedestal (114; Figure 1, 4) and sidewalls of the processing chamber (CC; Figure 1,4), and a first predetermined gap (118b; Figure 1) is between the substrate support pedestal (114; Figure 1, 4) and the restrictor plate (118; Figures 2-4, column 6, lines 26-41), and a second predetermined gap is between the restrictor plate (118; Figures 2-4, column 6, lines 26-41) and the sidewalls of the processing chamber (CC; Figure 1,4), as claimed by claim 29

ix. The apparatus (Figure 1; column 3, line 60 - column 4, line 54) of claim 10, wherein the at least one restrictor plate (118; Figures 2-4, column 6, lines 26-41) is supported within the processing chamber (CC; Figure 1,4) in a laterally spaced-apart relation (118b; Figure 1) relative to the substrate support pedestal (114; Figure 1, 4) and sidewalls of the

processing chamber (CC; Figure 1,4), and a first predetermined gap (118b; Figure 1) is between the substrate support pedestal (114; Figure 1, 4) and the restrictor plate (118; Figures 2-4, column 6, lines 26-41), and a second predetermined gap is between the restrictor plate (118; Figures 2-4, column 6, lines 26-41) and the sidewalls of the processing chamber (CC; Figure 1,4), as claimed by claim 30

Yonenaga teaches a plurality of support pins ("column" – see plural 48 Figure 1, column 4, lines 4-17) supporting Yonenaga's restrictor plate (46; Figure 1, column 4, lines 4-17).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Yonenaga's support pins to Komino's restrictor plate (118; Figures 2-4, column 6, lines 26-41), including adding additional restrictor plate (118; Figures 2-4, column 6, lines 26-41) hole(s) (118a; Figure 1) to the perimeter of Komino's restrictor plate (118; Figures 2-4, column 6, lines 26-41) providing a second predetermined gap.

Motivation to add Yonenaga's support pins to Komino's restrictor plate, including adding additional restrictor plate (118; Figures 2-4, column 6, lines 26-41) hole(s) (118a; Figure 1) to the perimeter of Komino's restrictor plate (118; Figures 2-4, column 6, lines 26-41) providing a second predetermined gap is for adding additional support means in addition to Komino's support means (118b; Figure 2) and for influencing exhaust flow pressures as taught by Komino (column 6; lines 43-51).

Claims 7, 8, 13, and 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komino; Mitsuaki et al. (US 6,156,151 A) in view of Yonenaga; Tomihiro et al. (US 5972114 A). Komino is discussed above. Komino does not teach:

i. The apparatus (Figure 1; column 3, line 60 - column 4, line 54) of claim 6, wherein the restrictor plate (118; Figures 2-4, column 6, lines 26-41) has a width that is wider at one portion of the restrictor plate (118; Figures 2-4, column 6, lines 26-41) than at another portion of the restrictor plate (118; Figures 2-4, column 6, lines 26-41), as claimed by claim 7

ii. The apparatus (Figure 1; column 3, line 60 - column 4, line 54) of claim 7, wherein the portion having the wider width is adapted for positioning proximate the exhaust port (112a, 2; Figure 1), as claimed by claim 8

iii. The system (Figure 1; column 3, line 60 - column 4, line 54) of claim 11, wherein the support pins (113, 116; Figure 2) retain the substrate supporting ring (111b; Figure 1,2) non-parallel with respect to a plane defined by a support surface of the substrate support pedestal (114; Figure 1, 4), as claimed by claim 13

iv. The system (Figure 1; column 3, line 60 - column 4, line 54) of claim 18, wherein the one restrictor plate (118; Figures 2-4, column 6, lines 26-41) has a width that is wider at one portion of the one restrictor plate (118; Figures 2-4, column 6, lines 26-41) than at another portion of the one restrictor plate (118; Figures 2-4, column 6, lines 26-41), as claimed by claim 19

v. The system (Figure 1; column 3, line 60 - column 4, line 54) of claim 19, wherein the portion having the wider width is positioned proximate the exhaust port (112a, 2; Figure 1), as claimed by claim 20

vi. The system (Figure 1; column 3, line 60 - column 4, line 54) of claim 20, wherein at least a portion of an outer edge of the one restrictor plate (118; Figures 2-4, column 6, lines

26-41) reduces a gap defined between the outer edge and an inner wall of the chamber (CC; Figure 1,4) along one section proximate the exhaust port (112a, 2; Figure 1), as claimed by claim 21

vii. The system (Figure 1; column 3, line 60 - column 4, line 54) of claim 10, wherein the at least one restrictor plate (118; Figures 2-4, column 6, lines 26-41) is one restrictor plate (118; Figures 2-4, column 6, lines 26-41) having an annular shape which completely surrounds the substrate support pedestal (114; Figure 1, 4) and a width that is wider at one portion of the one restrictor plate (118; Figures 2-4, column 6, lines 26-41) than at another portion of the one restrictor plate (118; Figures 2-4, column 6, lines 26-41), and wherein a portion of an outer edge of the one restrictor plate (118; Figures 2-4, column 6, lines 26-41) contacts an inner wall of the chamber (CC; Figure 1,4) at least in a location proximate the exhaust port (112a, 2; Figure 1), as claimed by claim 22

Yonenaga is discussed above.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the dimensions of Komino's apparatus parts restrictor plate (118; Figures 2-4, column 6, lines 26-41), and support pins (113, 116; Figure 2), further, adding additional restrictor plate (118; Figures 2-4, column 6, lines 26-41) hole(s) (118a; Figure 1) to the perimeter of Komino's restrictor plate (118; Figures 2-4, column 6, lines 26-41) providing a gap defined between the outer edge and an inner wall of the chamber.

Motivation to optimize the dimensions of Komino's apparatus parts restrictor plate (118; Figures 2-4, column 6, lines 26-41), and support pins (113, 116; Figure 2), further, adding additional restrictor plate (118; Figures 2-4, column 6, lines 26-41) hole(s) (118a; Figure 1) to the perimeter

of Komino's restrictor plate (118; Figures 2-4, column 6, lines 26-41) providing a gap defined between the outer edge and an inner wall of the chamber is for influencing process as flow characteristics of Komino's apparatus as taught by Komino (column 1; lines 51-61; column 6; lines 43-51). Further, it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art.(Gardner v. TEC Systems, Inc. , 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied , 469 U.S. 830, 225 USPQ 232 (1984); In re Rose , 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04)

(10) Response to Argument

Applicant states:

"

Thus, Li does not teach or suggest a restrictor plate supported within the processing chamber in a laterally space-apart relation relative to the substrate support pedestal and sidewalls of the processing chamber, as recited by claim 23.

"

and..

"

Furthermore, Li does not teach or suggest a first predetermined gap defined between a substrate support pedestal and a restrictor plate and a second predetermined gap defined between the restrictor plate and sidewalls of the processing chamber, as recited by claim 23.

"

In response, Li's restrictor plate (26; Figure 1,2; column 5; lines 35-54) is disclosed by Li as supported within the processing chamber (1; Figure 1). The Examiner does assert that Li does not teach a restrictor plate (26; Figure 1,2; column 5; lines 35-54) supported within the processing chamber (1; Figure 1) in a laterally spaced-apart relation relative to the substrate support pedestal (3; Figure 1) and sidewalls of the processing chamber (1; Figure 1), and a second predetermined gap is between the restrictor plate (26; Figure 1,2; column 5; lines 35-54) and the sidewalls of the processing chamber (1; Figure 1) – claim 23. As a result, the difference between claim 23 and the teachings of the prior art reduce to at least one of three possible rationale:

a. The relative dimension(s) between Li's restrictor plate (26; Figure 1,2; column 5; lines 35-54) and Li's processing chamber (1; Figure 1) walls.
b. The relative positioning, assuming a threshold tolerance, between Li's restrictor plate (26; Figure 1,2; column 5; lines 35-54) and Li's processing chamber (1; Figure 1) walls.
c. Li's restrictor plate (26; Figure 1,2; column 5; lines 35-54) hole(s) (25; Figure 1,2) *at the perimeter* of Li's restrictor plate (26; Figure 1,2; column 5; lines 35-54) as shown in Figure 2 do or do not cover the bounds of the claimed "second predetermined gap" and "laterally spaced-apart relation relative to the substrate support pedestal (3; Figure 1) and sidewalls of the processing chamber"

With respect to the item a above, *all* of the art of record and the pending claims of the present invention are all centered on controlling exhaust gas conductance (otherwise known as flow rate, pressure, flow/stream dynamics, etc...) from reaction chambers. This is supported by Applicant's statements (see Brief, page 11, last paragraph). To this end, *all* of the cited prior art, including Li,

illustrate the rudiments known to all artisans (in the fluid flowing art) that using any type of geometric obstruction, depending on the reactor design, in the exhaust flow would offer a level of control for such critical result-effective variable(s) thereby imparting a resultant control of the chamber pressure by flow restriction as taught by Li (column 8; lines 3-16) and Komino (column 7; lines 23-30; column 9; lines 21-40) for example. The Examiner believes that it is completely within the level of ordinary skill in the cited prior art for such practicing artisans to thus change the relative dimension(s) between Li's restrictor plate (26; Figure 1,2; column 5; lines 35-54) and Li's processing chamber (1; Figure 1) walls to thus impart control over chamber pressure as the result-effective variable as taught by Li (column 8; lines 3-16) and Komino (column 7; lines 23-30; column 9; lines 21-40) for example. In this manner, the relative dimension(s) between Li's restrictor plate (26; Figure 1,2; column 5; lines 35-54) and Li's processing chamber (1; Figure 1) walls forms the rudiments of a valve whose conductance, or, equivalently, the ability to control chamber pressure, depends on the relative dimension(s).

It is well established that changes in apparatus dimensions are within the level of ordinary skill in the art.(Gardner v. TEC Systems, Inc. , 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied , 469 U.S. 830, 225 USPQ 232 (1984); In re Rose , 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04)

With respect to point b above, the Examiner's same line of reasoning as stated for point a also applies. Because the prior art to Li and Komino each recognize the criticality of the processing chamber pressure the Examiner believes that it is completely within the level of ordinary skill in the art for the skilled artisan to relatively position Li's restrictor plate (26; Figure 1,2; column 5; lines 35-54) and Li's processing chamber (1; Figure 1) walls, assuming a threshold tolerance,

between Li's restrictor plate (26; Figure 1,2; column 5; lines 35-54) and Li's processing chamber (1; Figure 1) walls. In this manner such a relative positioning would impart control over of the chamber pressure and special flow dynamics as taught by Li (column 8; lines 3-16) and Komino (column 7; lines 23-30; column 9; lines 21-40) for example.

With respect to item c above, Li's restrictor plate (26; Figure 2; column 5; lines 35-54) illustrates holes 25, Figure 2 at the extreme perimeter of 26. The Examiner believes that such holes, or the addition of others, can be reasonably construed as being the "second predetermined gap" and the "laterally spaced-apart relation relative to the substrate support pedestal (3; Figure 1) and sidewalls of the processing chamber". However, because Li's Figure 2 is not to scale, such an assertion by the Examiner under anticipation may not be appropriate and for this reason, the Examiner stated that motivation to optimize the dimension(s) of Li's restrictor plate (26; Figure 1,2; column 5; lines 35-54) including adding additional restrictor plate (26; Figure 1,2; column 5; lines 35-54) hole(s) (25; Figure 1) to the perimeter of Li's restrictor plate (26; Figure 1,2; column 5; lines 35-54) providing a second predetermined gap is for controlling exhaust flow across 26 as taught by Li (column 5; lines 27-35). It is well established that the duplication of parts is obvious (In re Harza , 274 F.2d 669, 124 USPQ 378 (CCPA 1960) MPEP 2144.04).

Consistent with the Examiner's above three line of arguments that *all* of the prior art exhibit flow restricting means is Applicant's own statements concerning the perceived patentable feature(s) over the prior art:

"

In the present application, the claimed gap element is more than a mere separation of parts. In fact, the restrictor plate is already claimed in "a laterally space-apart relation relative to the

substrate support pedestal and sidewalls of the processing chamber." See, claim 23. Moreover, throughout the specification, *the gap is used to describe a passage defined between components used to control gas flow between the upper and lower regions of the processing chamber*, thereby allowing compensation for pumping asymmetries due to chamber geometries. As such, the gap is a flow regulating feature. The Examiner's interpretation of a gap that is completely filled by a solid object which does not allow gases to flow there through is not only contrary to the convention utilized by the Appellants throughout the specification, but would render the invention inoperable.

"

Applicant further states:

"

Here, the Examiner has taken an unduly broad, and thus, impermissible interpretation of a gap being present between the rectifying plate and substrate mount plate of Li because such an interpretation is inconsistent with the specification as it would be interpreted by one of ordinary skill.

"

In response, it is well established that claim terms are issued their "plain meaning" according to MPEP 2111.01: Claim terms are presumed to have the ordinary and customary meanings attributed to them by those of ordinary skill in the art. Sunrace Roots Enter. Co. v. SRAM Corp., 336 F.3d 1298, 1302, 67 USPQ2d 1438, 1441 (Fed. Cir. 2003); Brookhill-Wilk 1, LLC v. Intuitive Surgical, Inc., 334 F.3d 1294, 1298 67 USPQ2d 1132, 1136 (Fed. Cir. 2003).

Applicant states:

“

Furthermore, there was no teaching in Li that could have motivated one of ordinary skill in the art to derive to the elements of claim 23. The Examiner asserts that a motivation may be found to optimize the dimension of Li's restrictor plate by adding an additional restrictor plate to provide a second gap. The Appellants disagree. The Appellants submit that the Examiner provides no evidence of a teaching in Li or elsewhere on the record that would suggest adding a second restrictor plate. Moreover, adding a second restrictor plate would not yield a second gap consistent with the Appellant's teaches, as discussed above.

“

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, as stated above and in prior actions, motivation to optimize the dimension(s) of Li's restrictor plate (26; Figure 1,2; column 5; lines 35-54) including adding additional restrictor plate (26; Figure 1,2; column 5; lines 35-54) hole(s) (25; Figure 1) to the perimeter of Li's restrictor plate (26; Figure 1,2; column 5; lines 35-54) providing a second predetermined gap is for controlling exhaust flow across 26 as taught by Li (column 5; lines 27-35).

With respect to Applicant's statement that Li does not teach the limitations of dependent claim 24, it is noted that the Examiner specifically cited Li as teaching “the system (Figure 1; column

4, lines 13-33) of claim 23, wherein the restrictor plate (26; Figure 1,2; column 5; lines 35-54) further comprises a plurality of removable arc segments – Figure 2 shows element 26 separated at 120° increments", as claimed by claim 24

With respect to independent claims 1, 10, 23, and 28, Applicant states:

"

As such, the lower baffle plate 118 of Komino is not supported by a plurality of support pins.

"

However, independent claim 23 *does not* require support pins as argued. With respect to the remaining independent claims 1, 10, and 28, Applicant states:

"

Furthermore, Komino does not teach or suggest a restrictor plate supported within a processing chamber in a laterally spaced-apart relation, or a first predetermined gap between the substrate support pedestal and the restrictor plate, and a second predetermined gap between the restrictor plate and the sidewalls of the processing chamber. In contrast to the claimed invention, Komino discloses that baffle plate 118 attached to the central casing part CC is part of the chamber wall and also, by suspension ring 118b, is attached to the susceptor. Thus, the baffle plate of Komino can not be in a space-apart relation with the wall that it integrally extends therefrom or to the pedestal.

"

In response, the Examiner notes that independent claims 1 and 10 do not claim "restrictor plate supported within a processing chamber in a laterally spaced-apart relation, or a first

predetermined gap between the substrate support pedestal and the restrictor plate, and a second predetermined gap between the restrictor plate and the sidewalls of the processing chamber".

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "restrictor plate supported within a processing chamber in a laterally spaced-apart relation, or a first predetermined gap between the substrate support pedestal and the restrictor plate, and a second predetermined gap between the restrictor plate and the sidewalls of the processing chamber") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

However, with respect to independent claim 28 (23 is based on other references), which does claim a "restrictor plate supported within a processing chamber in a laterally spaced-apart relation, or a first predetermined gap between the substrate support pedestal and the restrictor plate, and a second predetermined gap between the restrictor plate and the sidewalls of the processing chamber", the Examiner's above arguments and analysis based on Li likewise apply to the teachings of Komino if not for the nearly identical structural analogs of restrictor plates in both Li and Komino, then for the intended use accord to all prior art equivalent restrictor plates cited. Specifically Komino's restrictor plate (118; Figures 2-4, column 6, lines 26-41) is disclosed by Komino as supported within the processing chamber (CC; Figure 1,4). The Examiner does assert that Komino does not teach a restrictor plate (118; Figures 2-4, column 6, lines 26-41) supported within the processing chamber (CC; Figure 1,4) in a laterally spaced-apart relation relative to the substrate support pedestal (114; Figure 1,4) and sidewalls of the

processing chamber (CC; Figure 1,4), and a second predetermined gap is between the restrictor plate (118; Figures 2-4, column 6, lines 26-41) and the sidewalls of the processing chamber (CC; Figure 1,4) – claim 28. As a result, the difference between claim 28 and the teachings of the prior art reduce to at least one of three possible rationale:

a. The relative dimension(s) between Komino's restrictor plate (118; Figures 2-4, column 6, lines 26-41) and Komino's processing chamber (CC; Figure 1,4) walls.

b. The relative positioning, assuming a threshold tolerance, between Komino's restrictor plate (118; Figures 2-4, column 6, lines 26-41) and Komino's processing chamber (CC; Figure 1,4) walls.

As asserted above for Li, the differences between the prior art at the cited prior art reduce to the rudiments known to all artisans (in the fluid flowing art) that using any type of geometric obstruction, depending on the reactor design, in the exhaust flow would offer a level of control for such critical result-effective variable(s) thereby imparting a resultant control of the chamber pressure by flow restriction as taught by Li (column 8; lines 3-16) and Komino (column 7; lines 23-30; column 9; lines 21-40) for example. The Examiner believes that it is completely within the level of ordinary skill in the cited prior art for such practicing artisans to thus change the relative dimension(s) between Komino's restrictor plate (118; Figures 2-4, column 6, lines 26-41) and Komino's processing chamber (CC; Figure 1,4) walls to thus impart control over chamber pressure as the result-effective variable as taught by Li (column 8; lines 3-16) and Komino (column 7; lines 23-30; column 9; lines 21-40) for example. In this manner, the relative dimension(s) between Komino's restrictor plate (118; Figures 2-4, column 6, lines 26-41) and Komino's processing chamber (CC; Figure 1,4) walls forms the rudiments of a valve whose

conductance, or, equivalently, the ability to control chamber pressure, depends on the relative dimension(s).

It is well established that changes in apparatus dimensions are within the level of ordinary skill in the art.(Gardner v. TEC Systems, Inc. , 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied , 469 U.S. 830, 225 USPQ 232 (1984); In re Rose , 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04)

With respect to point b above, the Examiner's same line of reasoning as stated for point a also applies. Because the prior art to Li and Komino each recognize the criticality of the processing chamber pressure the Examiner believes that it is completely within the level of ordinary skill in the art for the skilled artisan to relatively position Komino's restrictor plate (118; Figures 2-4, column 6, Lines 26-41) and Komino's processing chamber (CC; Figure 1,4) walls, assuming a threshold tolerance, between Komino's restrictor plate (118; Figures 2-4, column 6, Lines 26-41) and Komino's processing chamber (CC; Figure 1,4) walls. In this manner such a relative positioning would impart control over of the chamber pressure and special flow dynamics as taught by Li (column 8; lines 3-16) and Komino (column 7; lines 23-30; column 9; lines 21-40) for example.

Applicant states:

"

Yonenaga teaches a flow regulator plate 46 that is supported within a process chamber 12 by a single annular support column 48. The flow regulator plate 46 is also coupled to the sidewalls of the process chamber 12. *Therefore, regulator plate 46 of Yonenaga is not supported by a plurality of pins as asserted by the Examiner.* Moreover, as the baffle plate of Komino integrally

extends from the chamber wall and bridges to the substrate support, there is no motivation to separately support the baffle plate with an annular ring as taught by Yonenaga

"

In response, the Examiner disagrees. *All* references cited in the Examiner's final rejection exhibit some form of supporting structure for each of the cited restrictor plates. In particular Yonenaga teaches a plurality of support pins ("column" – see plural 48 Figure 1, column 4, lines 4-17) supporting Yonenaga's restrictor plate (46; Figure 1, column 4, lines 4-17).

In response, Applicant states:

"

Komino's restrictor plate itself is a part of the chamber wall. There is no teaching or suggestion in Komino of a need for an additional support. Therefore, there is no need for an "additional" support, as asserted by the Examiner. The additional support added to part of the chamber wall would be redundant to the Komino's restrictor plate. Even if the annular support column of Yonenaga was utilized in Komino's chamber, the claimed elements of a plurality of support pins are still not taught or suggested by any of the references of record. As such, one of ordinary skill in the art would have not been motivated by Komino and Yonenaga to provide additional support by a plurality of support pins.

"

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge

generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, motivation to add Yonenaga's support pins to Li's restrictor plate (26; Figure 1,2; column 5; lines 35-54) is for adding additional support means in addition to Li's support means. Further, it is well established that the duplication of parts is obvious (In re Harza , 274 F.2d 669, 124 USPQ 378 (CCPA 1960) MPEP 2144.04).

Applicant states:

"

Furthermore, neither Komino nor Yonenaga provides motivation to incorporate an additional restrictor plate to Komino's integrated restrictor plate to create a gap because, as discussed above, Komino's restrictor plate itself is a part of the chamber wall. Accordingly, one of ordinary skill in the art would not be motivated, in light of the cited references, to add an additional restrictor plate to Komino's restrictor plate/chamber wall in a manner that would create a gap. Therefore, Yonenaga fails to teach, show, or suggest a modification to Komino that would yield at least one restrictor plate supported within the semiconductor processing chamber by a plurality of support pins, as recited by claims 1, 10 and 25, or a restrictor plate in a laterally space-apart relation relative to the sidewalls of a processing chamber wherein a first predetermined gap is between the substrate support pedestal and the restrictor plate, and a second predetermined gap is between the restrictor plate and the sidewalls of the processing chamber, as recited by 25 and 28.

"

In response, the reproduction of apparatus parts leading to plural restrictor plates is also believed to be within the level of ordinary skill in the art. In much the same way that the Examiner's

above lines of argument concerning the teachings in the prior art for controlling exhaust gas conductance, it is viewed in the fluid flow prior art, that any obstruction, or obstructions being part of an aggregate or otherwise is believed to also be within the level of ordinary skill in the art. Further, that a single prior art element is subdivided into constituent parts, is also believed to be obvious for skilled artisans in general. Further, it has been held that it is obvious to make whole elements separable (In re Dulberg, 289 F.2d 522, 523, 129 USPQ 348, 349 (CCPA 1961) – MPEP 2144.04. That *all* the cited prior art suggests a type of subdivision of restrictor plates by adding through holes, supports the Examiner's position. Functionally, is it unobvious to divide a prior art restrictor plate with through holes or, equivalently, to divide the restrictor plate itself into constituent parts with through spaces between the parts?

Applicant's arguments with respect to claim 5 (page 16), claims 16, 26 (page 17), claims 7-8, 13, and 19-22 (Page 18,19) also fall within the level of ordinary skill where apparatus dimensions are optimized as discussed in the body of the claim rejection: "Motivation to optimize the dimensions of Komino's apparatus parts restrictor plate (118; Figures 2-4, column 6, lines 26-41), and support pins (113, 116; Figure 2), ... is for influencing process as flow characteristics of Komino's apparatus as taught by Komino (column 1; lines 51-61; column 6; lines 43-51)." Further, it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art.(Gardner v. TEC Systems, Inc. , 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied , 469 U.S. 830, 225 USPQ 232 (1984); In re Rose , 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04).

Applicant's arguments with respect to claims 3 and 11 (Page 16) are addressed above.

Applicant's arguments with respect to claim 16 (Page 17) is addressed above.

Applicant's arguments with respect to claims 29, 30 (Page 17) is addressed above.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

(12) Evidence Appendix

No evidence submitted.

For the above reasons, it is believed that the rejections should be sustained.

This examiner's answer contains a new ground of rejection set forth in section **(9)** above. Accordingly, appellant must within **TWO MONTHS** from the date of this answer exercise one of the following two options to avoid *sua sponte* **dismissal of the appeal** as to the claims subject to the new ground of rejection:

(1) **Reopen prosecution.** Request that prosecution be reopened before the primary examiner by filing a reply under 37 CFR 1.111 with or without amendment, affidavit or other evidence. Any amendment, affidavit or other evidence must be relevant to the new grounds of rejection. A request that complies with 37 CFR 41.39(b)(1) will be entered and considered. Any request that prosecution be reopened will be treated as a request to withdraw the appeal.

(2) **Maintain appeal.** Request that the appeal be maintained by filing a reply brief as set forth in 37 CFR 41.41. Such a reply brief must address each new ground of rejection as set forth in 37 CFR 41.37(c)(1)(vii) and should be in compliance with the other requirements of 37 CFR 41.37(c). If a reply brief filed pursuant to 37 CFR 41.39(b)(2) is accompanied by any

amendment, affidavit or other evidence, it shall be treated as a request that prosecution be reopened before the primary examiner under 37 CFR 41.39(b)(1).

Extensions of time under 37 CFR 1.136(a) are not applicable to the TWO MONTH time period set forth above. See 37 CFR 1.136(b) for extensions of time to reply for patent applications and 37 CFR 1.550(c) for extensions of time to reply for ex parte reexamination proceedings.

Respectfully submitted,

Rudy Zervigon (Primary Examiner, Art Unit 1763)

A Technology Center Director or designee must personally approve the new ground of rejection set forth in section (9) above by signing below:

GREGORY MILLS
QUALITY ASSURANCE SPECIALIST

Gregory Mills (QAS 1700 – TC 1700 Director designee)

Conferees:

Parviz Hassanzadeh (SPE Art Unit 1763)

/Jennifer Michener/

Quality Assurance Specialist, TC1700

Jennifer Michener (QAS TC 1700)